LEARNING STYLE PREFERENCES AND LEARNING STRATEGIES IN INTENSIVE CARE NURSE EDUCATION.

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ABSTRACT

Learning styles and the promotion of effective learning environments have been a focus of research for many decades. It is important for Educators to be aware of variations in learner needs, interests, abilities and previous learning so that educational strategies can be tailored accordingly. This study focused on recognition of differences in individual learning styles and the importance of relating learning strategies to learning styles as part of a competency-based educational approach. The study explored the learning style preferences of a group of twenty Registered Nurses undertaking a structured learning program in Intensive Care. Learning strategies used in this program were also explored to enable comparison between preferred learning styles and strategies. Exploration of individual learner preferences and learning strategies was undertaken using the Index of Learning Styles (ILS) devised by Soloman & Felder. Participants were also asked to indicate their perceived accuracy of the assessment and provide suggestions for improvement in educational support. Results from this study showed that there were some significant differences between individuals' preferred learning styles and the learning strategies used in the program. This was particularly evident in the area of visual versus verbal (or written) learning aspects where the majority of learners demonstrated a preference for visual learning while the learning program utilised mostly written learning strategies. This led to a change in the educational support offered to students and also provided input into the overall program review. Furthermore, it gave directions for future research regarding the value of learning style preferences assessment in program development, implementation and evaluation. It is envisaged that the benefits of this enhanced and individualised support for learning could have a positive impact on nursing staff recruitment and retention for the organisation involved.

INTRODUCTION

Individuals learn at different rates and in different ways. It is important for Educators to be aware of variations in learner needs, interests, abilities and previous learning so that educational strategies can be tailored accordingly

(Felder 1996). This paper explores the learning style preferences of a group of Intensive Care Registered Nurses undertaking a structured learning program. Learning strategies used in this program are also explored to enable comparison between preferred learning styles and strategies.

BACKGROUND

It has been reported that today's nurses, particularly those working in specialised areas require a broad skill base involving advanced technical expertise, critical thinking, communication, leadership and motivation, computer literacy and cultural sensitivity (Bechtel et al 1999). Within the context of continuing nursing education for Intensive Care Registered Nurses, issues of health care reform, technological innovations and economic efficiency affect educational needs and program design. The challenge for Nurse Educators in this context is to provide professional development that is easily accessible and convenient (Billings & Rowles 2001) with a sound evidence basis (Ironside 2001). Furthermore, societal trends valuing information over industry emphasise the need to provide training programs that promise, deliver and certify specified competencies. These factors have influenced the current competency-based approach to continuing nursing education in Australia (Chapman 1999).

The core principles of a competency-based educational approach include features such as flexibility, self-direction and individualisation of programs. Achievement for learners is outcome-focused, with competence in relation to specific aspects of knowledge, skill or attitude being the central goal (Harris et al 1995). An important aspect involves orientation of learners to the nature and processes of the competency-based program, a central element of which is recognition of individual learning styles. Part of the orientation process may include focusing on learning styles as a way of individualising the learning program, and identifying the learners' readiness to undertake the responsibilities involved in a self-directed learning approach (Delahaye & Smith 1995).

Learning Styles

Learning styles and the promotion of effective learning environments have been a focus of research for many decades (Terry 2001). While learning style may be defined simply as 'the way people come to understand and remember information' (Brown 1998, p.1) the literature contains many more complex variations on this theme. The variations in definition tend to reflect the perspectives of different learning style inventories, which seek to assess learning preferences using a number of methods. These include evaluation according to either perceptual, cognitive and affective dimensions (James & Gardner 1995); categorisation according to learning style models – personality, information processing, social interaction or instructional preferences (Griggs 1991);

evaluation of physical or sensory preferences (Gentry 1990); and brain hemisphericity theories (Asselin & Mooney 1996).

Information on learning styles of students and how the styles change or develop over time has implications for Educators in relation to the development and ongoing review of instructional design (Lemire 2000). Many researchers recommend educators provide a diverse range of learning activities / strategies for students, in an effort to accommodate differences in learning styles (Harris et al 1995, Brown 1998, Felder & Silverman 1998). However, more recent investigation has found that merely increasing the range of teaching methods used has not been associated with an improvement in learning outcomes. Rather, the evidence suggests that through improving students' awareness of their own learning style, they are better able to take responsibility for their own learning, which leads to improved learning outcomes (Fritz 2002).

Exploration of learning strategies in conjunction with individual learner preferences is an important activity in maintaining and improving the quality of an educational program. The enhanced future learning opportunities and outcomes gained from such an exploration could have a positive impact on nursing staff recruitment and retention for the organisation involved (Heath 2001).

This paper reports on a pilot study designed to explore the current status of learning strategies and learning style preferences in Intensive Care Nurse Education at a specific site within Queensland Health. The program under investigation is the *Transition to Intensive Care Nurse Education Program* (TICNEP), a state-wide learning program which links training outcomes with the Australian College of Critical Care Nursing *Competency Standards for Critical Care Nurses* (2002). The TICNEP is based on an instructional design involving self-directed, flexible learning modules, with clinical support provided by Nurse Educators and clinical resource people. As part of a quality review of the program a pilot study was undertaken at the Princess Alexandra Hospital (PAH). It is envisaged that the study could be replicated as part of a quality review of the program throughout Queensland Health.

METHODS

The study explored two areas – the learning style preferences of a group of TICNEP participants and the learning strategies used within the TICNEP. Ethics approval for the study was gained from the PAH Research Ethics Committee.

Learning Style Preferences:

The study focused on TICNEP participants at the PAH. The target population identified included Registered Nurses that were either currently undertaking the program or had completed the program less than two years previously. The timeframe of two years was selected so that participants would be able to adequately recall their experience while undertaking the program. The number of staff who qualified for inclusion in the study was seventy-nine. However, those who were on long-term leave, or had left PAH since completion of the program were excluded. This meant that a total of sixty-two people were invited to participate, with recruitment in the study continuing until a convenience sample of twenty was achieved.

Assessment of individual learning style preferences was achieved through use of the *Index of Learning Styles* (ILS) devised by Soloman & Felder (1998). This tool is a forty-four item self-scoring questionnaire used to assess preferences in four dimensions of learning: active/reflective, sensing/intuitive, visual/verbal and sequential/global.

The ILS tool was accessed and completed by participants via the Internet. The scores provided indicated, on a continuum, the strength of participants' preferences in each learning dimension. Following completion of the ILS and documentation of scores, a link to the ILS *Feedback* page was provided, which gave participants information regarding the various learning style preferences and suggested learning strategies for each area of preference.

Participants' ILS scores were documented and their response regarding the accuracy of the assessment was evaluated using a Likert scale. An opportunity for comments was also provided to allow participants to make suggestions for improvement in the learning strategies used in TICNEP, given their individual learning style preferences. This information, along with demographic details was collected using a brief questionnaire, which had previously been reviewed by a colleague for clarity of questions and instruction.

Data collection occurred during scheduled sessions that were coordinated at convenient times for participants. Consent was deemed by attendance at the session. Each session commenced with an introduction of the study and review of the participant information, with an opportunity for participants to ask questions regarding the study and/or decline involvement if desired. Questionnaires were distributed to the group for completion and access to the ILS provided via Internet at individual computers. The Investigator was available throughout the session to assist participants as required. Participants' names were not recorded on questionnaires and the Investigator did not identify individual responses.

Additionally, participants were asked to return their completed questionnaires via a collection box, ensuring anonymity.

Data analysis was performed according to participant demographics, learning styles (numbers of participants who identified with each learning style and their position along the continuum), numbers of participants agreeing / disagreeing with the suggested learning profile, and analysis of comments regarding suggested improvements to TICNEP delivery to determine relevant themes.

Learning Strategies:

An analysis of the TICNEP *Curriculum Document* and individual learning guides was undertaken to ascertain the types and predominance of learning strategies utilised in the TICNEP. Learning strategies identified were categorised according to descriptions outlined in the ILS feedback information, which provides suggested learning strategies for each area of preference (this information is summarised in Table 1).

Table 1: Summary of suggested learning strategies for learning style preferences as outlined in the Index of Learning Styles Feedback Page (Felder & Soloman 1998).

Learning Style Preference	Suggested Learning Strategies
Active	• Discussion, application, or explanation of information • Group work • Practical experimentation
Reflective	• Thinking or reflecting on information learned • Working alone • Summarising information in own words
Sensing	• Learning facts, details • Problem-solving using established methods • Clear expectations • Practical application, connection to the 'real-world'
Intuitive	• Discovering relationships between concepts • Innovative strategies • Problem-solving using 'lateral thinking' / abstraction • Impatient with details
Visual	• Visual aids to accompany verbal / print-based instruction (eg. pictures, diagrams, flow-charts, CD-ROMs, demonstrations) • Concept mapping best to learn information • Colour coding prompts for notes
Verbal	• Written / spoken explanations of concepts • Written summaries best to learn information • Study in groups to enhance discussion
Sequential	• Information presented in linear steps with logical connections • Problem solving using logical, step-wise method
Global	• Need to understand the 'big picture' (purpose/application) to grasp concept • Relationship of new concepts to existing knowledge • Clear learning outcomes

RESULTS

Learning Style Preferences:

Demographic data obtained from the twenty participants in this study indicted that there was an even distribution of age, with the majority of participants having greater than six months experience with the TICNEP. This impacted on the participants' ability to comment on the learning strategies used in the program, as they were familiar with the majority of the course and had a good understanding of the instructional design.

Information from participants' ILS results was collated according to the position of their scores along a continuum of *Well Balanced (WB), Moderate Preference (MP) or Strong Preference (SP)* in each learning dimension: Active/Reflective, Sensing/Intuitive, Visual/Verbal, Sequential/Global. These results are indicated in the diagrams, Figures 1 - 4.

Figure 1: Active / Reflective Preferences

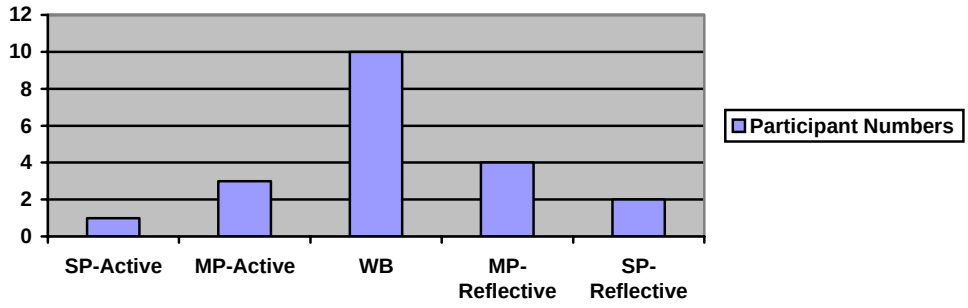


Figure 2: Sensing / Intuitive Preferences

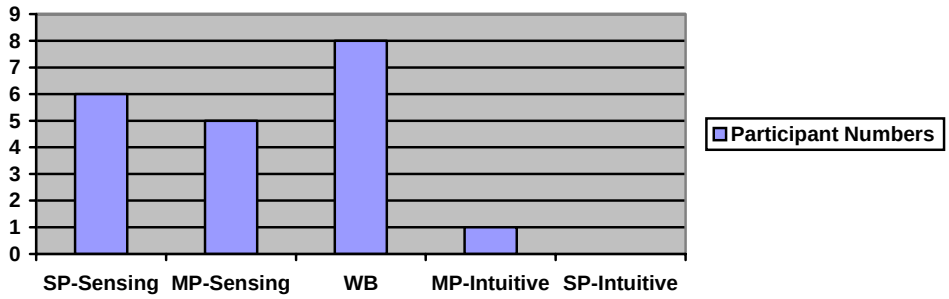


Figure 3: Visual / Verbal Preferences

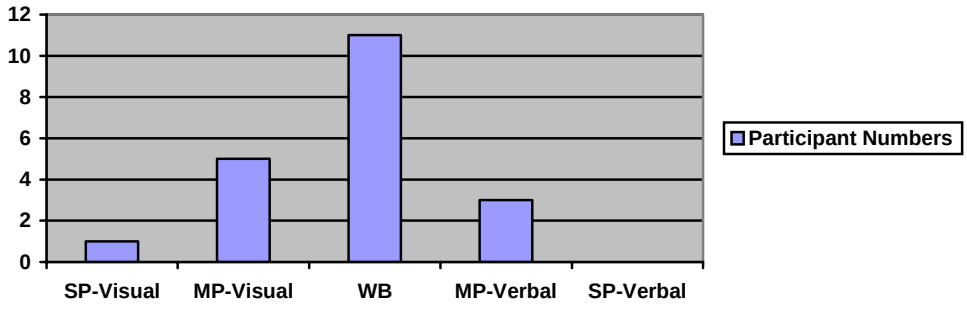
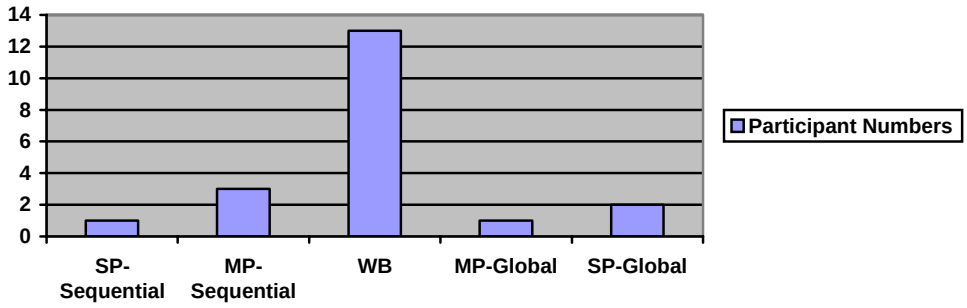


Figure 4: Sequential / Global Preferences



Results demonstrate an even distribution of participants with active and reflective learning preferences, a majority with sensing rather than intuitive learning preferences, a majority with visual rather than verbal learning preferences, an even distribution of participants with sequential and global learning preferences. Furthermore, the results show strong representation of students in the well-balanced learning category across all dimensions.

In response to the question regarding accuracy of the ILS, the majority of participants selected affirmative responses, with 5 (25%) selecting *Strongly Agree*, and 14 (70%) selecting *Agree*. Only one participant (5%) selected *Unsure.* This person's learning profile indicated that they were *Well Balanced* in all dimensions. It is possible that this lack of clear preferences in learning styles influenced their selection of the *Unsure* response to this question.

Three main themes were identified in the participant comments regarding suggestions for improvement in the learning strategies used in TICNEP. The first theme identified related to the need for inclusion of group work or tutorial sessions as part of TICNEP implementation. Suggestions for these sessions

included specific focus on learning material for each phase of the program, case history presentation, opportunity for discussion regarding the learning material, relationship to "real-life" scenarios and need for consolidation of learning. Comments were also made regarding the need for increased face-to-face contact with the Nurse Educator.

The remaining themes identified related to the need for enhanced use of visual learning strategies. Specifically, inclusion of more practical demonstrations (eg. models, multimedia presentation and simulation) and increased use of visual rather than written information in learning materials (eg. flow diagrams, concept maps and pictures).

Learning Strategies:
Results regarding the learning strategies used in TICNEP showed that the program materials contained a balance of both active and reflective learning strategies, with perhaps a bias toward reflective learning in some learning guides. It was also noted that there was limited opportunity for, or direction to pursue group work or peer discussion, instead focusing on resource person discussion.

There was a strong bias in the program materials toward sensate learning strategies with most activities emphasising factual learning, practical application of information and detailed explanation of concepts. With the exception of two of the learning guides (*Airway & Oxygenation* & *Neuroscience*) the program material uses predominantly verbal (written) learning strategies. The visual themes that are part of the instructional format, highlighting readings and activities are useful, but most of actual learning material is presented in written form.

The TICNEP material is predominantly presented in sequential format. This applies to the phased approach towards instructional design, as well as to the way in which information is presented in the learning guides. The *Airway & Oxygenation* learning guide is an exception in that it presents students with a view of the "bigger picture" or purpose in the introduction section, and also provides illustrations of clinical scenarios that relate the information learned to existing knowledge. Overall learning objectives stated in the program outline also provide clear expectations of learning outcomes for participants, which is consistent with a more global approach.

DISCUSSION

The aim of this study was to explore the individual learning styles of a group of Registered Nurses and compare the predominant styles with the range of learning strategies currently used in the TICNEP. The results gained have indicated that there are some important issues to be addressed in all dimensions.

A bias toward reflective learning strategies was observed, while the majority of participants' preferences were evenly distributed. This may point towards a need to increase the number of active learning opportunities in the TICNEP, such as group work and practical experimentation. This was further substantiated in the suggestions from participants.

It was also observed that a strong bias toward sensing learning strategies exists in the TICNEP. Learner preferences indicated a bias toward this learning style, so the materials appear to match learner preferences. However, it is interesting to note that the literature identifies an increasing need for nurses to adopt more abstract thinking skills (Bechtel et al 1999). This may provide Educators with direction for future learning material production.

The area of visual and verbal learning strategies presents perhaps the most interesting comparison, where the predominant learning strategies were verbal (or written) while the majority of learner preferences were for visual learning. This preference was further supported by the participant suggestions. This represents a significant deficit in the learning materials in catering for participants' learning styles. Another theme was that of using more practical demonstration or simulation activities to support learning, which also reflects visual learning preferences of participants.

There was an even distribution of learners across the sequential / global dimension of learning style. However, the TICNEP was observed to have a predominantly sequential focus, except for some isolated learning guides. It may be useful for each of the learning guides to have a section illustrating the purpose or application of information to strengthen this area. This is also supported in the participant comments referring to the need for case presentation to relate new information to 'real-life' situations, and may be achieved through tutorial sessions as mentioned above.

In consideration of the results from this pilot study it is important to recognise that results regarding learning style preferences may not necessarily be reproduced at other sites, or indeed at the PAH due to the variation in individual learning styles. Additionally, the ILS tool has only been subject to initial validity testing to date. However, it has been reported that this perspective of learning style assessment and accompanying suggestions for learning strategies has been shown to apply well to students in technical disciplines (Felder & Silverman 1998).

CONCLUSIONS

This study focused on the recognition of differences in individual learning styles and the importance of relating learning strategies to learning styles. A part of learner orientation to the TICNEP may involve focusing on learning styles as a way of individualising the learning program and identifying the learners' readiness to undertake the responsibilities involved in a self-directed learning

approach. Results have shown that assessment of participant learning preferences in comparison with learning strategies used provides useful information for program facilitation.

Further research may involve use of this methodology at other sites where the TICNEP has been implemented to determine whether the results gained in this investigation are representative of a majority of participants. Additionally, the use of learning preference assessment as a way of improving students' awareness of their own learning style, leading to an improvement in learning outcomes has not been studied in this investigation. This would be an interesting area to pursue, particularly with respect to the competency-based educational emphasis on individualisation of programs.

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